FORM PTO-1390
(Rev 10-9-94)

U.S. DEPARTMENT OF COMMERCE
Patent and Trademark Office
Docket No. 449122000900

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. § 371

09/647368

U.S. APPLICATION NO. (If known, see 37 C.F.R. § 1.5): _____

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/DE99/01074	9 April 1999	22 April 1998

TITLE OF INVENTION: POWER CIRCUIT-BREAKER

APPLICANT(S) FOR DO/EO/US: Bernhard BAUER et al.

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. § 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. § 371.
3. ☐ This express request to begin national examination procedures (35 U.S.C. § 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. § 371(b) and PCT Articles 22 and 39(1).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. § 371(c)(2))
   a. ☒ is transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☐ has been transmitted by the International Bureau.
   c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US)
6. ☐ A translation of the International Application into English (35 U.S.C. § 371(c)(2)).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. § 371(c)(3))
   a. ☒ are transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☒ have been transmitted by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
   d. ☐ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. § 371(c)(3)).
9. ☐ An oath or declaration of the inventor(s) (35 U.S.C. § 371(c)(4)).
10. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. § 371(c)(5)).

Items 11. to 16. below concern document(s) or information included:

11. ☐ An Information Disclosure Statement under 37 C.F.R. §§ 1.97 and 1.98.
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 C.F.R. §§ 3.28 and 3.31 is included.
13. ☐ A FIRST preliminary amendment.
    ☐ A SECOND or SUBSEQUENT preliminary amendment.
14. ☐ A substitute specification.
15. ☐ A change of power of attorney and/or address letter.
16. ☒ Other items or information: 1. Various PCT Documents 2. Return receipt postcard.

CERTIFICATE OF HAND DELIVERY

I hereby certify that this correspondence is being hand filed with the United States Patent and Trademark Office in Washington, D.C. on September 29, 2000.

LaVerne Wicketone

430 Rec'd PCT/PTO 29 SEP 2000

U.S. APPLICATION NO (If known, see 37 C.F.R. § 1.5) 09/647368	INTERNATIONAL APPLICATION NO. PCT/DE99/01074	DOCKET NUMBER: 449122000900

17. ☒ The following fees are submitted:

BASIC NATIONAL FEE (37 C.F.R. §§ 1.492(a)(1)-(5)):

CALCULATIONS PTO USE ONLY

Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO $840.00

International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO $670.00

International preliminary examination fee (37 CFR 1.482) not paid to USPTO by international search fee (37 CFR 1.445(a)(2)) paid to USPTO $690.00

International preliminary examination fee paid to USPTO (37 CFR 1.482) but all claims did not satisfy provision of PCT Article 33(1)-(4) $970.00

International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(1)-(4) $96.00

ENTER APPROPRIATE BASIC FEE AMOUNT =				$840.00	
Surcharge of **$130.00** for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 C.F.R. § 1.492(e)).				$0	
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE	$0	
Total claims	11 - 20 =	0	x $18.00	$0	
Independent claims	1 - 3 =	0	x $78.00	$0	
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ $260.00	$260.00	
TOTAL OF ABOVE CALCULATIONS =				$1100.00	
Reduction by ½ for filing by small entity, if applicable. Verified Small Entity Statement must also be filed (Note 37 C.F.R. §§ 1.9, 1.27, 1.28)				$0	
SUBTOTAL =				$1100.00	
Processing fee of **$130.00** for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 C.F.R. § 1.492(f)). +				$0	
TOTAL NATIONAL FEE =				$1100.00	
Fee for recording the enclosed assignment (37 C.F.R. § 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 C.F.R. §§ 3.28, 3.31). **$40.00 per property** +				$0	
TOTAL FEES ENCLOSED =				$1100.00	
				Amount to be refunded:	$
				charged:	$

a. ☒ A check in the amount of $1,100.00 to cover the above fees is enclosed.

b. ☒ The Assistant Commissioner is hereby authorized to charge any additional fees that may be required, or credit any overpayment to **Deposit Account No. 03-1952**.

NOTE: Where an appropriate time limit under 37 C.F.R. § 1.494 or 1.495 has not been met, a petition to revive (37 C.F.R. § 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

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Description

Protective switching device

The invention relates to a protective switching device, in particular to a differential-current circuit breaker, having a core-balance transformer which monitors a line network and which, via a tripping circuit and an actuation circuit, actuates a release which is coupled to a switching mechanism in order to operate a power breaker.

Such a protective switching device is known (US-A-4 001 646). It is used to ensure protection against a dangerous body current in an electrical system. This is the case, for example, when someone touches a live part of an electrical system. The fault current then flows via the person as a body current to ground. The circuit breaker which is used for protection against dangerous body currents safely and rapidly isolates the relevant circuits from the mains power supply when the so-called rated fault current is exceeded.

The construction of a circuit breaker is known in general form, for example, from "etz", Volume 107 (1986), issue 20, pages 938 to 945. There, Figures 1 to 3 in particular show basic circuit diagrams and functional principles of a fault-current circuit breaker (FI circuit breaker) and a differential-current circuit breaker (DI circuit breaker).

FI and DI circuit breakers are constructed in a similar way from three assemblies. A core-balance transformer, through whose transformer core all the current-carrying conductors of a line network are passed induces a voltage signal in its secondary

winding in the event of a fault current, and this voltage signal actuates a release which is connected to the secondary winding. For its part, the release is coupled to a switching mechanism via which, when the release is operated, the contacts of a power breaker connected in that line or in each line are opened. In the process, the FI circuit breaker draws the energy required for tripping from the fault current itself, irrespective of the mains power supply voltage, while tripping in the case of a DI circuit breaker takes place as a function of the mains power supply voltage. To this end, when a fault current occurs in the electrical circuit supplied from the line network, the signal emitted from the core-balance transformer is supplied, after amplification by means of an electronics unit that is dependent on auxiliary energy, to the DI tripping circuit of the DI circuit breaker or DI accessory.

A test device having a test button is provided for checking the serviceability of such a protective switching device for circuit breaker, which test button is normally connected between the neutral conductor (N) and a phase conductor (L1, L2, L3) of the line network. When the test button is pressed, a fault current is simulated, and the reaction of the circuit breaker is tested. In this case, the circuit breaker must trip with virtually no delay when in the serviceable state.

Furthermore, a remote release is frequently provided in such circuit breakers, via which - for example for disconnection - the circuit breaker and thus the power breaker coupled to it can be operated externally. In order to provide a remote release for a DI circuit breaker, one option is for a mate contact to be connected in parallel with the test contact via a remote tripping line connected to said DI circuit breaker. Another option is for a separate winding to be provided in addition to the test winding on the

core-balance transformer, which separate winding is connected between two external conductors or between one phase conductor and the neutral conductor via a current limiting resistor, for operation of a remote tripping switch. These two versions for remote tripping on the one hand also require at least one auxiliary contact, however, in a disadvantageous manner. On the other hand, the feeders to the remote tripping switch and the switch contact for the remote release must be designed for a particularly high withstand voltage.

In the case of a DI accessory for power breakers, an additional exacerbating factor is that no auxiliary contacts can be provided owing to the switching paths accommodated in the power breaker. Since such circuit breakers are also designed with three poles, a connection between two outer conductors would also be required. Furthermore, a particular feature of DI circuit breakers or accessories is that tripping time delays of up to one second can frequently be set. Thus, if the remote release were operated according to the said variance, a relatively long tripping time would have to be taken into account - depending on the time delay setting. However, this is unacceptable with regard to emergency disconnection.

The invention is thus based on the object of specifying a protective switching device which can be tripped remotely in a simpler and more reliable manner.

This object is achieved according to the invention by the features of claim 1. A tripping circuit is provided for this purpose, which actuates the release when remote tripping takes place.

The tripping circuit comprises a transformer which has a primary winding and a second winding and whose primary is connected via an actuation circuit to the release.

When the transformer is actuated, preferably by short-circuiting its secondary winding, the tripping circuit produces a control signal for the release on the primary side of the transformer.

The tripping circuit expediently also has an oscillator in the form of a square-wave generator, which acts on the primary winding of the transformer. In order to keep the current drawn by the square-wave generator or oscillator as low as possible in this case, the frequency, on the one hand, is chosen to be as high as possible since the inductive impedance of the primary winding of the transformer increases in proportion to the frequency. Since, on the other hand, the remote tripping line which is connected to the transformer has an impedance which becomes increasingly low as the frequency increases owing to the parasitic capacitance between the conductor cores, the frequency is expediently set to between 500 Hz and 5 kHz. The frequency levels are optimized to the assumed primary inductance of the transformer of not less than 1 Henry, and to a cable length between the transformer and a remote tripping switch of not more than 300 m.

In one expedient refinement, the tripping circuit has a comparator which is connected on the primary site of the transformer and is connected on the output side to the actuation circuit of the release. It is thus possible to set a response threshold for the release for remote tripping by comparing the signal on the primary side of the transformer with a reference signal in order to produce an appropriate actuation signal.

In order to limit the current flow through the primary winding of the transformer when a secondary winding is

short-circuited, a non-reactive resistor is connected downstream of the comparator within the tripping circuit on the primary side of the transformer. This is particularly advantageous if the power supply for the tripping circuit is live after remote tripping. A resistor of not less than 10 kΩ is particularly expedient with regard to a minimum current draw.

In one advantageous refinement, the reference signal source provided to produce the reference signal within the tripping circuit has a reference voltage divider which is connected in series with a zener diode to a supply voltage. This means that the reference voltage is zero for as long as the rising operating voltage remains below the response voltage of the zener diode when the supply voltage is connected. As a result of the supply voltage being switched off, the reference voltage falls to zero when the falling operating voltage becomes less than the response voltage of the zener diode. This effectively prevents spurious tripping caused by remote tripping electronics when the voltage supply is being switched on and off.

In order to prevent an electrostatic charge on the line which is connected to the transformer for remote tripping, the secondary of the transformer is expediently connected to ground potential by a series of circuits comprising at least two non-reactive resistors.

The actuation circuit preferably has a comparator which is connected on the output side via a controllable electronic switch to the release. The electronic switch is expediently a transistor, whose

control input is connected to the comparator and in whose collector-emitter circuit the tripping relay coil of a tripping relay is connected.

The advantages achieved by the invention are, in particular, that remote tripping without any auxiliary contact is possible by means of a tripping circuit which acts on the release of a protective switching device connected on the secondary side of a core-balanced transformer and as a transformer whose primary is connected to the release. Furthermore, there is no need for any special requirements for the withstand voltage of the remote tripping line and the remote tripping switch. Since the tripping circuit acts directly via the actuation circuit on the release, there is virtually no delay in the actuation for remote tripping of a circuit breaker with a tripping time delay, so that safe emergency disconnection is ensured by remote tripping of the circuit breaker.

An exemplary embodiment of the invention will be explained in more detail in the following text with reference to a drawing, in which:

Figure 1 shows, schematically, the design of a DI circuit breaker with a tripping circuit for remote tripping, and

Figure 2 shows the circuit design of the tripping circuit shown in Figure 1.

Mutually corresponding parts are provided with the same reference symbols in both figures.

Figure 1 shows the basic functional design of the differential-current circuit breaker as a protective switching device having a tripping circuit 2 and having an actuation circuit 3, which is fed from this tripping circuit 2, for a release 4, as well as having a tripping

circuit 5 for remote tripping. The tripping circuit 2 comprises a core-balance transformer 6, through whose primary transformer core 7 all the current-carrying lines of a single-phase or polyphase line network Ln are passed. The secondary winding 8 of the core-balance transformer 6 is connected to a comparator 13 in the actuation circuit 3 via an electronic amplifier 10 with rectification and with a tripping time delay 12 connected downstream from it.

The comparator 13 is connected on the output side to a controllable electronic switch which, for its part, is connected to the release 4. In the exemplary embodiment, the switch is a bipolar npn transistor 14, whose base is actuated by the comparator 13 and in whose collector-emitter circuit, which is connected to the operating voltage U_B, a tripping release coil 15 of the release 4 is connected. The release 4 is coupled to a mechanism in the form of a switching mechanism 16 which acts on a switching path, connected in each line of the line network Ln, of a power breaker 18.

When the DI circuit breaker is operating in the absence of any faults, the vectorial sum of the currents flowing in the two directions in the line network is equal to zero. However, if a fault current via ground occurs, for example as a result of an insulation fault in a load device (not illustrated), then this interferes with the current equilibrium in the core-balance transformer 6. The transformer core 7 is magnetized in a corresponding way to the magnitude of the fault current, so that a voltage is induced in the secondary winding 8 of the core-balanced transformer 6. A corresponding amplified, rectified and a time-delay tripping signal S_s is supplied to the actuation circuit 3 of the release 4. When the release 4 responds, the switching paths of the power breaker 18 are opened via the

switching mechanism 16, and the damaged part of the system is in consequence disconnected.

The release 4 can furthermore be actuated by means of remote tripping. To this end, the tripping circuit 5 comprises a transformer 20 having a primary winding N1 and a secondary winding N2, via which the tripping circuit 5 can be activated by means of the remote tripping signal S_s. A square-wave oscillator 22 acts on the primary winding N1 of the transformer 20. If the secondary of the transformer 20 is short-circuited, then the voltage across the primary winding N1 of the transformer 20 collapses. This is detected by a comparator 24 connected on the primary side to the transformer 20. On exceeding a reference voltage U_{Ref}, the comparator 24 acts on the tripping circuit 2 to actuate the tripping relay coil 15 of the release 4, by the tripping circuit 5 supplying the comparator 13 of the actuation circuit 3 with an appropriate control signal Ss. In this case, this action takes place after the tripping circuit 2, and thus after the tripping time delay 12, if such a tripping time delay 12 is provided.

Figure 2 shows the design of the tripping circuit 5 for remote tripping. The transformer 20 has a voltage divider which is connected in parallel with the secondary winding N2 and is formed by two non-reactive resistors R11 and R12 which are connected to ground PE. This prevents any electrostatic charge on the remote tripping line (not shown) which is connected from the remote release to the connections FA1 and FA2.

The remote tripping lines are connected to the secondary winding N2 of the transformer 20 via connections FA1 and FA2. The square-wave oscillator 22 which is connected to the primary winding N1 is formed by a comparator V1 with the

illustrated circuitry comprising the resistors R1 to R4 and the capacitor C1. The frequency f of the square-wave oscillator 22 is set by appropriate dimensioning of the time constant τ = R1 x C1.

In order to keep the current drawn by the oscillator 22, and thus by the tripping circuit 5, as low as possible taking into account the impedance (X_c = $1/2\pi fC$), which decreases as the frequency f increases owing to the parasitic capacitance between the conductor cores of the remote tripping lines, and taking into account the inductive impedance (X_L = $1/2\pi fL$) of the primary winding N1, which increases with the frequency f, the frequency f is preferably set to between 500 Hz and 5 kHz. This takes into account a primary inductance Lp $\geq$ 1H which can be achieved for a minimum physical volume of the transformer 20, and a cable length l between the transformer 20 and a remote tripping switch (not shown) of l $\leq$ 300 m.

The voltage across the primary winding N1 of the transformer 20 is rectified and smoothed by means of a diode D1 and a capacitor C2. If the secondary winding N2 of the transformer 20 is short-circuited as the result of remote tripping, then the voltage across the primary winding N1 collapses, and the capacitor C2 is discharged via a resistor R6 connected in parallel with it. When the voltage across the capacitor C2 becomes less than the reference voltage U_{Ref} of the comparator 24, which is designed as an inverting comparator V2 with hysteresis, then its output changes from low level to high level. To this end, the comparator V2 is connected to the resistors R9, R10 and to the capacitor C3 in the manner illustrated. The level change is used for controlling the actuation circuit 3 by the comparator V2 (24) supplying the appropriate

control signal S_s via the comparator 13 to the base control input of the transistor 14. This results in the transistor 14 being switched on, so that current flows through the tripping relay coil 15 of the release 4, which is connected to the operating voltage U_B via the collector-emitter circuit of this transistor 14.

A resistor R5, which is connected downstream on the output side of the comparator V1 of the square-wave oscillator 22 and is located in the primary winding N1 of the transformer 20, limits the current flow via the primary winding N1 when the secondary winding N2 is short-circuited in the situation where the power supply is live after remote tripping. In order to achieve a minimum current drawer, R5 should be chosen to be $\geq 10\ k\Omega$.

The reference voltage U_{Ref} of the comparator V2 is produced by means of a reference voltage divider R7, R8, which is connected to a supply voltage U_v and contains a series-connected zener diode D2. As long as the rising operating voltage of the tripping circuit 5 is less than the response voltage of the zener diode D2 when the supply voltage U_v is connected, the reference voltage is $U_{Ref} = 0$ V. When the supply voltage U_v is disconnected, the reference voltage U_{Ref} falls to 0 V when the falling operating voltage of the tripping circuit 5 falls below the response voltage of the zener diode D2. Spurious tripping caused by remote tripping electronics when the supply voltage U_v is being switched on and off is thus effectively prevented.

In an alternative method of operation on the DI circuit breaker, the secondary of the transformer 20 is short-circuited using a break contact as a remote tripping switch. Undershooting of the reference voltage U_{Ref} would then result in actuation of the release 4 owing to a change in the control signal S_s of the comparator 24

(V2) in the tripping circuit 5.

Patent Claims

1. A protective switching device, in particular a differential current circuit breaker, having a core-balance transformer (6) which monitors a line network (Ln) and actuates a release (4) which, via a tripping circuit (2) and an actuation circuit (3), actuates is coupled to a switch mechanism (16) in order to operate a power breaker (18), characterized in that a tripping circuit (5), which can be tripped by means of a remote tripping signal (Sf), is connected to a transformer (20) which can be actuated on the secondary side and whose primary side is connected to an actuation circuit (3) of the release (4) for remote tripping of the protective switching device.

2. The protective switching devices claimed in claim 1, characterized in that, if the secondary of the transformer (20) is short-circuited, the tripping circuit (5) produces a control signal (S_s) for the actuation circuit (13) of the release (4).

3. The protective switching devices claimed in claim 1 or 2, characterized in that the tripping circuit (5) comprises an oscillator (22) which is connected to the primary side of the transformer (20).

4. The protective switching devices claimed in claim 3, characterized in that the oscillator (22) is a square-wave generator whose frequency (F) is set to between 500 Hz and 5 Hz.

5. The protective switching devices claimed in one of claims 1 to 4, characterized in that the tripping circuit (5) has a comparator (24; V2) which is

connected on the primary side to the transformer (20) and is connected on the output side to the actuation circuit (13) for the release (4).

6. The protective switching devices claimed in one of claims 1 to 5, characterized in that the tripping circuit (5) has a non-reactive resistor RS ≥ 10 kΩ which is connected to the primary winding (N1) of the transformer (20).

7. The protective switching devices claimed in one of claims 1 to 6, characterized in that the tripping circuit (5) has a reference signal source having a voltage divider (R7, R8) which is fed from a supply voltage (U_v), via a zener diode (D2).

8. The protective switching devices claimed in one of claims 1 to 7, characterized in that secondary of the transformer (20) is connected to ground potential (PE) via a resistor series circuit (R11, R12).

9. The protective switching devices claimed in one of claims 1 to 8, characterized in that the actuation circuit comprises a comparator (13) with a downstream controllable electronic switch (14), which is connected to the release (4).

10. The protective switching device as claimed in claim 9, characterized in that the controllable switch is a transistor (14) whose base control input is connected to the comparator (13) and in whose collector-emitter circuit a tripping relay coil (15) of the release (4) is connected.

Abstract

Protective switching device

Protective switching device, in particular differential-current circuit breaker, having a core-balance transformer (6) which monitors a line network (Ln) and which, via a tripping circuit (2) and an actuation circuit (3), actuates a release (4) which is coupled to a switching mechanism (16) in order to operate a power breaker (18). The invention provides that a tripping circuit (5), which can be tripped by means of a remote tripping signal (S_f), is connected to a transformer (20) which can be actuated on the secondary side and whose primary side is connected to an actuation circuit (3) of the release (4) for remote tripping of the protective switching device.

Figure 1

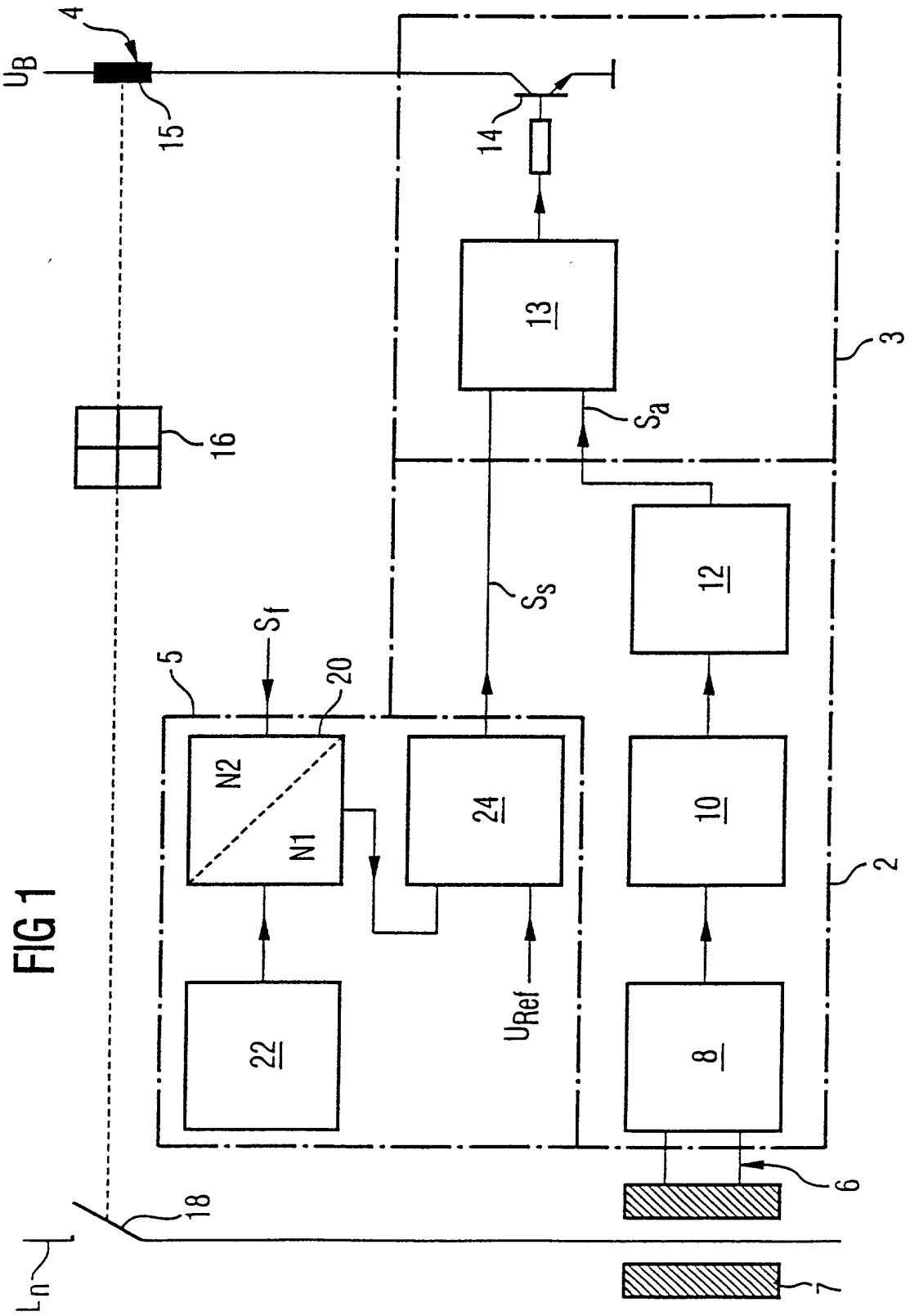

FIG 1

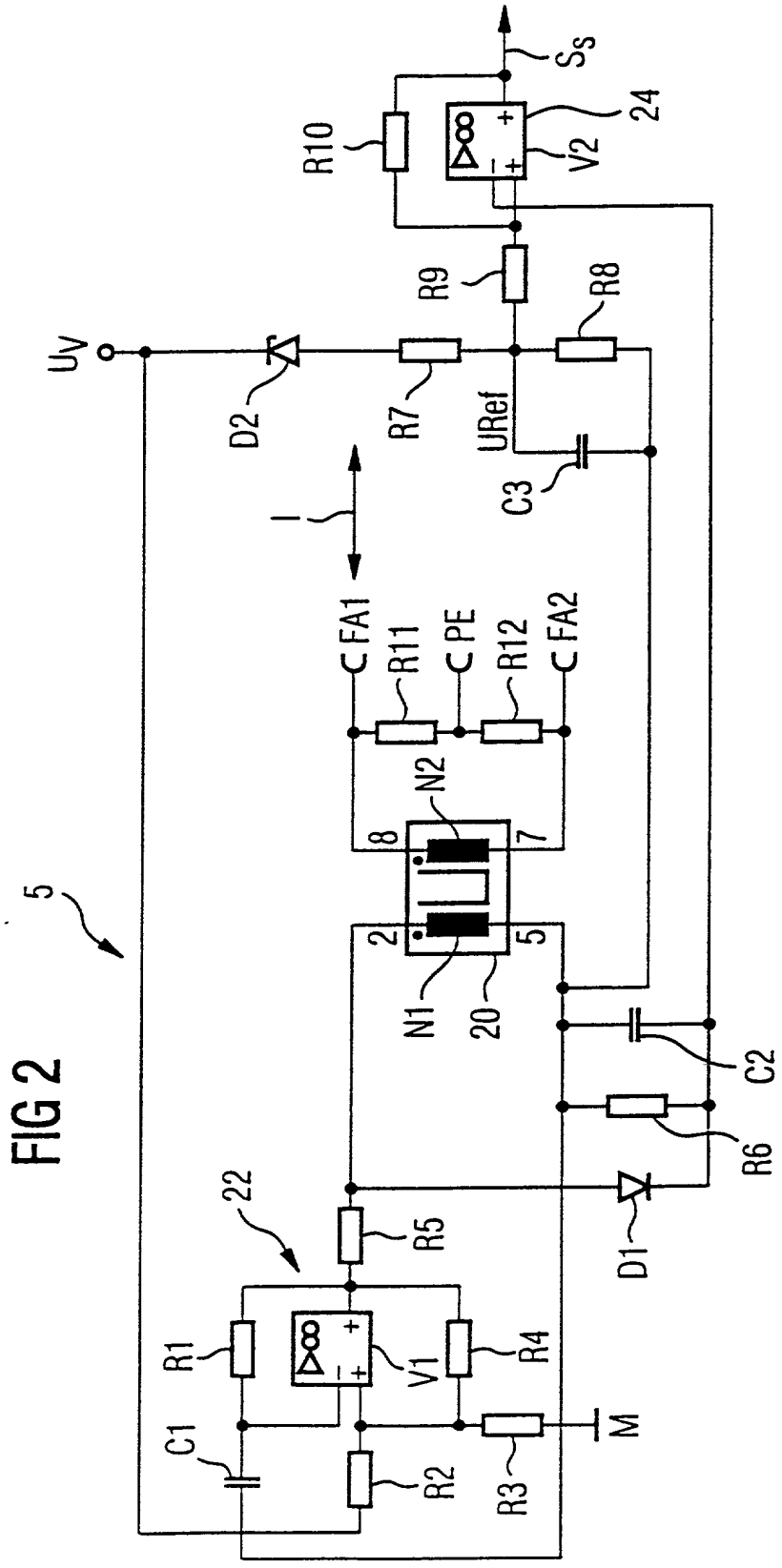
Ss
24
V2
R10
R9
R8
Uv
D2
R7
URef
C3
I
FA1
R11
PE
R12
FA2
N2
8
7
2
5
N1
20
5
C2
R6
D1
22
R5
R1
V1
R4
C1
R2
R3
M

FIG 2

Declaration and Power of Attorney For Patent Application
Erklärung Für Patentanmeldungen Mit Vollmacht
German Language Declaration

Als nachstehend benannter Erfinder erkläre ich hiermit an Eides Statt:

As a below named inventor, I hereby declare that:

dass mein Wohnsitz, meine Postanschrift, und meine Staatsangehörigkeit den im Nachstehenden nach meinem Namen aufgeführten Angaben entsprechen,

My residence, post office address and citizenship are as stated below next to my name,

dass ich, nach bestem Wissen der ursprüngliche, erste und alleinige Erfinder (falls nachstehend nur ein Name angegeben ist) oder ein ursprünglicher, erster und Miterfinder (falls nachstehend mehrere Namen aufgeführt sind) des Gegenstandes bin, für den dieser Antrag gestellt wird und für den ein Patent beantragt wird für die Erfindung mit dem Titel:

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

SCHUTZSCHALTGERÄT

PROTECTIVE SWITCHING DEVICE

deren Beschreibung

(zutreffendes ankreuzen)

☐ hier beigefügt ist.

☒ am 09. April 1998 als
PCT internationale Anmeldung
PCT Anmeldungsnummer PCT/DE99/01074
eingereicht wurde und am ____
abgeändert wurde (falls tatsächlich abgeändert).

the specification of which

(check one)

☐ is attached hereto.

☐ was filed on ____ as
PCT international application
PCT Application No. ____
and was amended on ____
(if applicable)

Ich bestätige hiermit, dass ich den Inhalt der obige☐n Patentanmeldung einschliesslich der Ansprüche durchgesehen und verstanden habe, die eventuell durch einen Zusatzantrag wie oben erwähnt abgeändert wurde.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims as amended by any amendment referred to above.

Ich erkenne meine Pflicht zur Offenbarung irgendwelcher Informationen, die für die Prüfung der vorliegenden Anmeldung in Einklang mit Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) von Wichtigkeit sind, an.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

Ich beanspruche hiermit ausländische Prioritätsvorteile gemäss Abschnitt 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 119 aller unten angegebenen Auslandsanmeldungen für ein Patent oder eine Erfindersurkunde, und habe auch alle Auslandsanmeldungen für ein Patent oder eine Erfindersurkunde nachstehend gekennzeichnet, die ein Anmeldedatum haben, das vor dem Anmeldedatum der Anmeldung liegt, für die Priorität beansprucht wird.

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

German Language Declaration

Prior foreign appplications
Priorität beansprucht

			Priority Claimed	
198 18 054.3	Germany	22. April 1998	☒	☐
(Number) (Nummer)	(Country) (Land)	(Day Month Year Filed) (Tag Monat Jahr eingereicht)	Yes Ja	No Nein
			☐	☐
(Number) (Nummer)	(Country) (Land)	(Day Month Year Filed) (Tag Monat Jahr eingereicht)	Yes Ja	No Nein
			☐	☐
(Number) (Nummer)	(Country) (Land)	(Day Month Year Filed) (Tag Monat Jahr eingereicht)	Yes Ja	No Nein

Ich beanspruche hiermit gemäss Absatz 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 120, den Vorzug aller unten aufgeführten Anmeldungen und falls der Gegenstand aus jedem Anspruch dieser Anmeldung nicht in einer früheren amerikanischen Patentanmeldung laut dem ersten Paragraphen des Absatzes 35 der Zivilprozeßordnung der Vereinigten Staaten, Paragraph 122 offenbart ist, erkenne ich gemäss Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) meine Pflicht zur Offenbarung von Informationen an, die zwischen dem Anmeldedatum der früheren Anmeldung und dem nationalen oder PCT internationalen Anmeldedatum dieser Anmeldung bekannt geworden sind.

I hereby claim the benefit under Title 35. United States Code. §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §122, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occured between the filing date of the prior application and the national or PCT international filing date of this application.

(Application Serial No.) (Anmeldeseriennummer)	(Filing Date) (Anmeldedatum)	(Status) (patentiert, anhängig, aufgegeben)	(Status) (patented, pending, abandoned)
(Application Serial No.) (Anmeldeseriennummer)	(Filing Date) (Anmeldedatum)	(Status) (patentiert, anhangig, aufgeben)	(Status) (patented, pending, abandoned)

Ich erkläre hiermit, dass alle von mir in der vorliegenden Erklärung gemachten Angaben nach meinem besten Wissen und Gewissen der vollen Wahrheit entsprechen, und dass ich diese eidesstattliche Erklärung in Kenntnis dessen abgebe, dass wissentlich und vorsätzlich falsche Angaben gemäss Paragraph 1001, Absatz 18 der Zivilprozessordnung der Vereinigten Staaten von Amerika mit Geldstrafe belegt und/oder Gefängnis bestraft werden koennen, und dass derartig wissentlich und vorsätzlich falsche Angaben die Gültigkeit der vorliegenden Patentanmeldung oder eines darauf erteilten Patentes gefährden können.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

German Language Declaration

VERTRETUNGSVOLLMACHT: Als benannter Erfinder beauftrage ich hiermit den nachstehend benannten Patentanwalt (oder die nachstehend benannten Patentanwälte) und/oder Patent-Agenten mit der Verfolgung der vorliegenden Patentanmeldung sowie mit der Abwicklung aller damit verbundenen Geschäfte vor dem Patent- und Warenzeichenamt: *(Name und Registrationsnummer anführen)*

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. *(list name and registration number)*

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And I hereby appoint

Messrs John D Simpson (Registration No. ~~19,842~~) Lewis T. Steadman (~~17,074~~), William C Stueber (16,453), P Phillips Connor (~~19,259~~), Dennis A. Gross (24,410), Marvin Moody (~~16,549~~), Steven H. Noll (28,982), Brett A. Valiquet (~~27,841~~), Thomas I. Ross (29,275), Kevin W. Guynn (29,927), Edward A Lehmann (22,312), James D Hobart (24,149), Robert M Barrett (30,142), James Van Santen (~~16,584~~), J. Arthur Gross (13,615), Richard J Schwarz (13,472) and Melvin A. Robinson (31,870), David R Metzger (32,919), John R. Garrett (~~27,888~~) all members of the firm of Hill, Steadman & Simpson, A Professional Corporation.

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(Supply similar information and signature for third and subsequent joint inventors).